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BRITISH HONDURAS

ANNUAL REPORT

OF THE

Agriculture Department

FOR THE YEAR

1965

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DEPARTMENT OF AGRICULTURE

ANNUAL REPORT

FOR THE YEAR ENDED 31st DECEMBER, 1965

I. INTRODUCTION

POLICY

The basic policy of the Department is:-

(i) To obtain the maximum degree of self-sufficiency in respect of all crops and livestock products that can be economically produced within the country.
(ii) To improve the quality, quantity and range of export crops.
(iii) To develop the livestock industry and promote an export trade in the products thereof.
(iv) To further develop the fishing industry and expand the range of export production.
(v) To conserve the natural resources.
(vi) To promote farming as a way of life based on a sound system of agriculture

2. Considerable tracts of land in British Honduras await development, most of this land is not inherently fertile but under good management it is capable of sustaining high yielding crops and stock. There is, however, an acute lack of capital and technical skills, which with a traditional concept of farming as a partime occupation, severely impedes development. The introduction of modern techniques and skills by foreign investors together with the field and educational work of the Department, is bringing about a change in outlook. The poor communications, the limited internal markets, as well as the previously mentioned dearth of capital and skills, slows the change over from semi-subsistence to economic farming.

General Review

3. In 1965 further production records were set. Sugar production increased from 33,591 tons to 35,288 tons. Rice from 4,508,522 lbs paddy to 5,229,831 lbs. Citrus Production continued at a high level as did that of corn and beans. Renewed interest was experienced in the livestock industry with increases in acreages under improved pastures and the national herd topping the 33,000 mark. Although in general the level of production was maintained or increased the productivity was comparatively low, resulting in uncompetitive production costs. The comparatively low prices which prevailed in both the citrus and sugar industries is causing more attention to be given to production methods and costs than heretofore.

II. WEATHER

4. January was wetter than usual, thereafter dry conditions set in and continued through June when the prolonged dry season was broken with frequent rain showers. Intermittent heavy showers persisted for the remainder of the year, being exceptionally heavy in early November, causing widespread floods especially in the central parts of the country. The heavy rains late in the year impeded rice harvesting and delayed the planting of R.K. Beans. The highest record rainfall was 172.85" at Barranco in Toledo District, whilst 5.62" of rain was registered in twenty-four hours at Stann Creek Agricultural Station during November. Detailed rainfall and temperature data are given in Appendices II and III.

III. FOOD CROPS

5. Production of the major food crops maintained an upward trend, largely through an increase in the acreage planted, with on the whole little improvement in returns per acre. Total production, however, still falls short of the domestic requirements the balance being imported. Limited quantities of improved

/ and hybrid ....

and hybrid seed of the principal food crops were imported to boost production, these introductions gave significantly higher yields than the locally produced seed, but the high landed cost of improved seed inhibits a ready adoption of better varieties by the average farmer.

6. Beans - Red Kidney

Year	Acreage	Est. Production (lbs)	Marketing Board Purchases (lbs)
1962/63	1,587	1,269,600	747,088
1963/64	1,810	905,000	482,627
1964/65	1,884	1,507,200	583,891

7. The crop planted during the latter part of 1964 and harvested early in 1965 yielded fairly well, in some cases as high as 1,800 lbs per acre of dried beans. Planting of the 1965/66 crop was delayed by the very wet conditions prevailing during October to December, the limited acreage that was planted during this period showing little promise of a worthwhile yield. It is expected that considerable plantings will take place early in 1966, as soon as conditions permit. The average yield of R.K. Beans is low at 800 lbs/acre; in an attempt to improve the position 108,400 lbs of selected seed were imported from the U.S.A. This seed was sold to farmers at cost -25/cents a lb. Only the more progressive farmers accepted that high quality seed is essential to obtain good yields, the majority are adversely influenced by the comparatively high cost of the seed.

8. Maize

Year	Acreage	Est. Production (lbs)	Marketing Board Purchases (lbs)
1963	13,331	6,665,500	227,981
1964	11,383	9,106,400	775,972
1965	13,390	12,051,000	256,000*

* As at 15th February, 1966.

9. The 1965 crop was by local standards good with average yields of 900 lbs clean corn per acre. An increasing quantity of corn is being traded between farmers rather than through the Marketing Board. The Mennonites in particular purchase considerable quantities for processing as animal and poultry food. Several other commercial farmers gear their corn production to pig and poultry raising, thus notwithstanding an increase in production, smaller quantities tend to be sold to the Marketing Board. For the 1965 crop 1,545 lbs of hybrid corn seed was imported, Cornell 54 and Poey T66. This seed sold at cost -/43¢ per lb seemed too expensive to most farmers, but yields in excess of 4,000 lbs/acre were obtained by some of the farmers who planted this seed. As a result a small but promising demand has been created for hybrid corn seed.

10. Rice

Year	Acreage	Est.Production (lbs.) Paddy	Marketing Board Purchases (lbs.) Paddy
1963/64	3,131	4,695,500	2,718,006
1964/65	3,918	5,877,000	4,508,522
1965/66	6,381	7,657,200	5,229,831*

*As at 15th February, 1966.

11. Keen interest continues to be shown in rice growing, both the acreage and the production being an all time record. Nevertheless the position is far from satisfactory, in Toledo District the largest producing area, bad weather conditions coupled with primitive harvesting methods, resulted in much of the rice being of poor quality due to high moisture content, partial fermentation and mustiness.

/About .....

About ten percent of the crop in the area became unsuitable for human consumption, whilst the proportion of red rice especially in the variety B.G. 79 became too high, for consumer acceptance. On the other hand in Orange Walk District, where extensive rice growing is of very recent origin good yields of high quality rice were obtained. Belize District normally the second highest producing area suffered severely from flooding, and yields were reduced.

12. To improve both the yields and the quality of the rice grown 5,000 lbs of Belle Patna and 5,000 lbs of Blue Bonnett 50 selected seed were imported from the U.S.A. Again the cost to the grower of this seed -/35 cents per lb seemed prohibitive, nevertheless those farmers who planted this seed obtained yields of up to 3,200 lbs per acre against an average of 1,500 lbs per acre of paddy.

13. Under the existing conditions, an increase in acreage tends to result in a decrease in quality, unless the harvest weather is exceptionally favourable. This is caused by the acute shortage of labour at harvest time and the primitive method of harvesting. Unfortunately land cleared for rice is not normally stumped making mechanical harvesting impracticable. The accepted practice of saving one's own seed has also resulted in deterioration of quality, but the price of selected imported seed inhibits a mass adoption of purchasing fresh seed for each crop.

14. The production of rice, together with importations and estimated consumption over the past ten years is given in Appendix X.

15. Vegetables

Overall production increased, but the Belize City Market was still subject to widely fluctuating supplies of local vegetables, necessitating regular importation of various types of vegetables to meet consumer demands. The heavy floods of November further reduced local production.

16. Plantains

Supplies were generally sufficient for the demand, with seasonal gluts helping to promote commercial plantain crisp production. Surpluses were only available over short periods and were insufficient in both quality and duration to support an export trade.

17. Other Food and Fruit Crops

Supplies of cassava flour, sweet potatoes, etc. were generally adequate, irish potatoes and onions being mainly imported. A bumper crop of mangoes was recorded, with fair to average crops for most other fruits. Collection, grading, packing and transportation problems, inhibited the export of these seasonal fruits, which at the peak were well in excess of local requirements.

IV EXPORT CROPS

18. Agricultural exports continued to rise, with marketing conditions becoming keener especially in citrus products.

19. SugarCane

The grinding season commenced on the 15th January and ended on the 27th August, being the longest season on record. Indiscriminate cane burning caused losses which in the case of small cane farmers were often severe; stale burnt and green cane undoubtedly contributed to the low T.C.T.S. of 9.23 the lowest recorded since 1959.

SUGAR CANE CROP STATISTICS 1956-65

	1956	1957	1958	1959	1960	1961	1962	1963	1964	196
Acres cane harvested	N/A	6500	6179	7666	10058	11000	11000	13000	14000	155
Tons cane reaped	35246	77049	89635	159017	123752	243460	213490	210362	272319	3257
Tons sugar produced	3510	7811	11067	16712	13641	27577	25817	27840	33591	352
Tons cane/ acre	N/A	11.85	14.51	20.74	12.34	22.15	19.41	16.81	19.45	21.
Tons sugar/ acre	N/A	1.20	1.79	2.15	1.36	2.12	2.35	2.41	2.40	2.
Tons cane/ tons sugar	10.04	9.83	8.10	9.40	9.10	8.83	8.16	7.56	8.11	9.
Annual rainfall	42.53	38.24	60.19	36.26	62.09	48.54	47.58	34.57	67.68	57.

Growers received $9.25 per tons of cane compared with $11.57 in the previous season. The 1966 crop is estimated at 42,300 tons.

20. Citrus

Weakening markets with future prospects poor caused a halt in the planting of citrus excepting for a new venture whose development programme included citrus. The acreage of commercial citrus is estimated at 8,664 acres, comprising 6,414 acres of oranges and 2,250 acres of grapefruit with a bearing acreage of 4,338 and 852 respectively.

CROP STATISTICS 1964/65 CROP

PROCESSOR	MONTH	ORANGES(90 lbs boxes)	GRAPEFRUIT(80 lbs boxes
A	August 1964	Nil	Nil
B		Nil	13,810
A	September	Nil	Nil
B		Nil	20,179
A	October	Nil	Nil
B		7,049	26,566
A	November	11,598	48,806
B		5,636	39,759
A	December	3,613	29,255
B		Nil	29,171
A	January 1965	49,107	5,138
B		21,947	27,865
A	February	76,887	Nil
B		128,406	936
A	March	81,311	Nil
B		138,932	Nil
A	April	81,794	1,530
B		73,832	Nil
A	May	81,921	Nil
B		62,283	Nil
A	June	29,455	Nil
B		2,493	Nil
	Totals	856,264	243,015

A - British Honduras Fruit Company Ltd.
B - Citrus Company of British Honduras

PRODUCTION 1964/65 CROP SEASON

	Oranges	Grapefruit
British Honduras Fruit Co.Ltd.	415,686	84,729
Citrus Co. of British Honduras	440,578	158,286
	856,264	243,015

The following citrus products were exported during 1965:-

Citrus Company of British Honduras:-

Oranges	Exported
Juice	191,903 ctns. 24/A2s & 6/A10s Sweetened Trouthall
Juice	7,677 ctns. 6/A10s unsweetened Trouthall
Concentrate	8,098 -60 - 6/A10s
Concentrate 60 & 6/1	1,050 Barrels - 42 gals. ea. 60 Brix
Oil	39 Wooden cases
Oil	658 small drums of 108 lbs nett.
Oil	38 large drums of 400 lbs nett
Concentrate	23,436 ctns. 6/A10s 65 Brix
Grapefruit	
Sections	175,636 ctns. 24/A2s Trouthall & Blue Island
Juice	15,400 ctns. 6/A10s Sweetened Trouthall
Juice	8,800 ctns. 6/A10s Unsweetened Trouthall
Concentrate	97 barrels 4/1 Trouthall

British Honduras Fruit Company

360,884 gallons orange - 65 Brix frozen concentrate
21,660 gallons grapefruit - 58 Brix concentrate

22. The production of oranges showed an increase over the previous season whilst the quantity of grapefruit processed was less, this was essentially due to limited buying and not to actual production. The prices paid for 1964/65 crop varied between $1.00 to $2.00 per 90 lb box of oranges and -/90 cents to $1.20 per 80 lb box of grapefruit. The 1965/66 season opened with prices of -/80 cents per box of either grapefruit or oranges. Sale of budded citrus plants from the Agricultural Department's nursery totalled 8,258 plants of which more than half were used for supply purposes.

23. Cacao

The Hummingbird Development Corporation the only commercial cacao producer ceased operations during the year, having shipped a total of 118,996 lbs compared with 47,180 lbs of dried beans in the previous year.

24. Bananas

A total of 20,530 boxes (40 lbs) of bananas were shipped to the U.S.A. during the year all coming from Green and Atkins Ltd., excepting 1,438 boxes produced by a local grower. A change in husbandry methods late in 1965 is expected to boost production further.

Banana Export Data

Boxes 40 lbs. each

1963	46,533 boxes
1964	11,337 boxes
1965	20,530 boxes

25. Considerable interest was expressed by residents of the Monkey River area in banana production, at the end of 1965 possible development areas were being investigated.

26. Honey

The number of hives increased by 8.1% but honey production dropped by 4.0% due to inclement conditions during the main nectar flow period.

District	Apiaries	Hives	Beekeepers	Production lbs. 1964	1965
Corozal	86	2,915	39	182,747	167,912
Orange Walk	78	2,385	26	150,894	148,056
Belize	5	127	4	312	2,450
Cayo	4	69	4	1,984	2,004
Stann Creek	9	88	8	3,206	4,798
Punta Gorda	2	17	2	-	-
Caye Caulker	1	2	1	-	-
Total	185	5,603	84	339,143	325,220

27. A total of 561,000 lbs (850 drums) was exported during the year, there being a carry-over of 133 long tons from 1964. Of the 295 long tons total stock in 1965, 15 tons were sold locally, 250 tons were exported, leaving a balance of 30 tons on hand. The average production per hive was 65 lbs of honey.

28. Tobacco

Flue-cured Virginia type tobacco has been grown on a small scale in Orange Walk District for several years. A high incidence of 'frog-eye' and the competing claims of sugar cane production has severely restricted production. During 1965 the Honduran Tobacco Company, started tobacco production in Cayo District, with some 200 acres of cigar filler leaf, and 30 acres of wrapper leaf. The venture has so far proved very promising, with harvesting in full swing at the close of the year, providing employment for some 300 persons.

V. LIVESTOCK

29. The national cattle herd was estimated at 33,000 head at the close of the year; a pig census gave a population of slightly over 14,000 head, whilst the sheep population is estimated at 1,200 head. The main problem confronting the cattle industry continued to be a lack of markets, in the absence of processing plants. Altogether 653 head of cattle were exported on the hoof to Mexico, whilst 4,231 head were slaughtered within the country at the very low average dressed weight of 249 lbs. In the rural areas, especially, the lack of cold storage facilities leads to the slaughtering of small animals thus ensuring that all the meat can be sold on the day of slaughter, this practice is also followed to a considerable extent at the Belize City slaughterhouse. Over the years this practice has resulted in a build up of over age steers and unthrifty stock, causing overstocking on most farms, though much land remains for development. Plans have been submitted and a development concession granted for the construction of a meat packing plant, erection had not started at the close of the year.

30. Exports on the hoof to Mexico were of considerable importance, offering at least a safety valve, prior to the erection of a meat plant, and accounted for:-

653 Cattle
1,655 Pigs
77 Sheep
17,403 Live Poultry
27,860 Eggs

Higher prices were obtained for sales to Mexico than for local ones, prime steers fetched up to -/20¢ per lb. liveweight at the farm, whilst pigs realised up to -/35¢ per lb. liveweight, compared with around -/16¢ and -/21¢ per lb. respectively for home sales. 3,174 pigs and 180 head of sheep were slaughtered for local consumption.

31. The main health problems with cattle were those arising from malnutrition consequent upon overstocking and the lack of improved pastures, intensified by heavy infestations of internal and external parasites. Swine fever outbreaks continued intermittently especially in the Orange Walk District, the need to vaccinate being not yet fully appreciated.

VI. AGRICULTURAL DEVELOPMENT AND EXTENSION WORK

32. General

The staffing position improved during the year and the necessary reorganisation of the Department was brought about. The staff improvement was mainly at the specialist and agricultural officer level, the all important Farm Demonstrator cadre continues to consist mostly of untrained personnel whose basic educational standards are insufficient to absorb much of the science and technique of modern agriculture. A farm planning unit was set up at the beginning of the year to help the more willing and co-operative farmers over the hurdle from subsistence to economic farming. Research programmes into crops, livestock and farm management were expanded, nevertheless, until many of the investigations now in progress have run their course, advisory work continues to depend largely on rule of thumb, rather than on scientific fact.

33. Agricultural Education

The School of Agriculture at Central Farm held thirteen instructional courses during the year. Of these, two were for departmental staff, the remaining eleven courses were attended by a total of 132 farmers, the duration of the courses being from one to three weeks. Subjects covered by the courses ranged from general agriculture to specialised courses in animal husbandry, crop husbandry and veterinary medicine. The School was also responsible for the horticultural section of the farm as well as for the upkeep of the station grounds. In addition to growing and assessing vegetable varieties and new introductions. The section propagated some 9,947 ornamental shrubs others being used to beautify the station and the rest remaining in the nursery. A collection of orchids native to the country was started and further additions made to the botanical section.

34. Animal Husbandry and Pasture Work

With the arrival of an F.A.O. Livestock Advisor a vigorous culling of the Brahman and Red Poll herds at Central Farm was undertaken. A prize Brahman bull was purchased in Mexico and a Red Poll Bull of good characteristics in Jamaica. In order to better utilise the high quality pastures which can be fairly readily established on the alluvial river soils it was decided to import for trial purposes a herd of Jamaican Blacks and a herd of Herefords, the latter coming from the State of Kentucky in the U.S.A. The Jamaica Blacks settled well, the Herefords went through a difficult period going down with redwater and pneumonia, they suffered further through having thick winter coats, nevertheless despite these setbacks by the end of the year the Herefords were giving the most promising liveweight gains of any of the breeds.

35. Two Brown Swiss Dairy bulls were purchased as foundation material for supplying dairy cattle to small farmers, one bull coming from Mexico the other from the U.S.A. These bulls are presently being used to serve the existing mixed dairy type cows, but it is hoped to get some Brown Swiss heifers during 1966.

36. Several old pastures were ploughed up and replanted to pangola, Digitaria decumbens which is proving an outstandingly good pasture grass. Other areas were planted to Jaragua Hyperrentiarufa, Panicum maximum and for dry season grazing to Sudan grass Sorghum. A number of new introductions of grasses and legumes were put under observation in prepared plots.

37. The breeding herd of Jersey Duroc pigs was maintained and a breeding herd of large whites established. Three unrelated large white gilts and one boar being purchased from Bodles in Jamaica. Demand for breeding stock by farmers has kept ahead of the supply.

38. Agricultural Shows

One major and three minor shows were held during the year, namely, the Western Region Show at San Ignacio, in the Cayo District, the San Felipe and the Chan Pine Ridge shows in Orange Walk District and the Stann Creek Agricultural Show. The San Ignacio Show was more ambitious than previous years, the attendance was drastically reduced by torrential rains and floods making many roads impassable. The other shows during the year were also unluckywith the weather.

39. General Extension Work

The emphasis of extension work continued on the individual rather than mass approach, supplemented by the work of the Farm Planning Unit. Farm Demonstrators were given training courses at Central Farm, including simple veterinary medicine and carried out numerous field treatments with good results.

40. Fisheries

A Fisheries Officer was appointed in January 1965 to work under an F.A.O. Master Fisherman and subsequently under an F.A.O. Marine Biologist, shortly after his appointment the Fisheries Officer was sent on a four week instructional visit to Barbados followed by a week at the University of Miami studying the biology of the Spiny Lobster, Panulirus argus.

41. Essentially the problem was to find the maximum catch of lobster which could be taken annually without jeopardizing future production. All Fisheries Cooperatives were visited and arrangements made to get details of lobster catches through a series of forms as follows:-

Details of lobsters caught by:-

(1) Traps, drums, cans
(2) Skin-diving with hoostick, spear or bully net
(3) Lined Beach traps

Details of catch by:-

(4) Wholesale returns for markets, hotels etc.
(5) Export declaration forms

42. Initially there was a marked reluctance to provide statistical data but the position graudally improved, after it was announced that any additional lobster quotas would depend on accurate returns by Co-operatives. The season opened on July 15th and at the end of December 377,026 lbs of lobster tail had been exported. (Appendices VI- IX). From data collected it was shown that trap fishing was markedly more productive than skin-diving; this fact is being usedto promote further trap fishing; to discourage and presently prohibit the use of .. pointed instruments in the taking of lobster.

VII. INVESTIGATIONS

43. The advent of an Agronomist late in 1964 enabled research work on major food crops and rotations to be initiated.

Beans (Phaseolus Vulgaris)

(a) Field Beans - Approximately 18 acres of Californian Red Kidney Beans planted in early December, 1964 were hand harvested in early March, 1965. The yield of approximately 300 lbs/acre of beans at 15% moisture content was low because of the adverse weather conditions and poor drainage conditions of the newly cleared land in the North-West region of Central Farm. The gross revenue from the sale of 5,200 lbs of beans sold to the Marketing Board at $13.84/100 lb was $719.68.

(b) Red Kidney Bean Inter-Row Spacing and Plant Population Trial on the Flat Ref: R.D. 974

Object: To study the effect of various inter-row spacing and plant population on the yield of Red Kidney Beans grown on the flat.
Site: Central Farm
Soil Type: Cuxu Black/brown clay loam.
Experimental Design: 7x4 Randomized Block Design
Sample Plot Size: 0.01 acre
Dates from 50% germination to harvest: 9/12/64 to 25/2/65
Summary of Results: The yield results and Duncan Multiple Range Significance test are shown in Tables 1(a) and 1(b) below.

Table 1(a)

YIELDS OF RED KIDNEY BEANS (lbs/acre) at 14% MOISTURE CONTENT

Treatment			Mean Yield	Standard Error
Code	Spacing(ft.)	Plant Population /acre	lbs/acre	±
*A	1x1	130,680	1,683	281
B	½x1	87,120	1,595	90
C	1x1	43,560	1,215	98
D	1½x1	29,040	907	68
E	2x1	21,780	773	67
F	2½x1	17,424	784	9
G	3x1	14,520	454	9

* Milpa method: Alternate spacing with 3 seeds per hole. All other treatments were planted to give one seed/hole.

Table 1 (b)

DUNCANS MULTIPLE RANGE TEST ON THE MEAN YIELDS OF RED KIDNEY BEANS

Yield	445	773	784	907	1215	1595	1683
Code	G	E	F	D	C	B	A
	**	**	**	**	**		
	**	**	**	**			
	**						
	**						
	**						

** 1% Level of Significance
_ Not significant

≠ (The Duncans Multiple Range Test was found to be convenient method of comparing the individual mean yields of treatments. The treatments yields which were not significantly different at the 5% level of significance with all the intervening means were under-scored. The asterick(s) under a treatment denotes the significance level at which the treatment differs from the treatment taken as control.

It can be seen from Table 1(a) that as the plant population increased (or inter-row spacing decreased) the yield of beans increased. Table 1 (b) showed that treatments A and B were not significantly different from each other, but were significantly different (at 1% level of significance) from all other treatments. Treatment C was significantly different (1% level of significance) from Treatments D, F, E and G, but treatments D, F, and E were not significantly different from each other. All treatments were significantly different (1% level of significance) from Treatment G.

The results indicate than on heavy/medium soils at Central Farm the yields of Red Kidney Beans planted on the flat increase up to a population of 130,680 plants per acre (Milpa method) but for economic yields (margin over cost of seed and harvesting) the optimum plant population would be - 1'x1' or 1½x4" with 1 seed per hole. For mechanised operations 2'x3" - 4" would achieve the optimum populations. It is observed that closer spacing and higher plant populations so that the leaves of individual plants just touched each other to form a canopy, reduced weed competition. Weed competition was probably the most important single factor affecting yields with different spacings.

(c) Red Kidney Bean Inter-Row Spacing and Plant Population Trial on Beds (Ref. R.D. 974)

Object: To study the effect of inter-row spacing and plant population of Red Kidney beans on beds of different widths.
Site: Central Farm
Soil Type: Cuxu (type) black/brown clay loam. Redbank silty clay loam.
Experimental Design: 9x4 Randomized Block Design
Samplef 0.01 acre Dates from 50% germination to harvest :10/12/64 to 27/2/65
Summary of results: The yield results and Duncans Multiple Range Significance test are shown in Tables 2 (a) and 2 (b) below.

Table 2 (a)

YIELDS OF RED KIDNEY BEANS (lbs/acre) at 14% MOISTURE CONTENT

Treatment			Base Width beds ft.	Mean Yield lbs/acre	Standard Error ±
Code	Spacing (ft.)	Plant Pop/acre			
L	1x1	43,560	1	1,161	119
M	2x1	21,780	2	723	109
N	3x1	14,520	3	552	52
O	1x1	43,560	2	822	89
P	2x1	21,780	4	766	81
Q	3x1	14,520	6	633	36
R	1x1	43,560	3	996	124
S	2x1	21,780	6	736	41
T	3x1	14,520	9	608	55

Table 2 (b)

DUNCANS MULTIPLE RANGE TEST ON THE MEAN YIELDS OF RED KDNEY BEANS (lbs/acre)

Yield	552	608	633	723	736	766	822	996	1161
Code	N	T	Q	M	S	P	O	R	L
	**	**	**	**	**	*	*		
	**	*	*						

* 5% level of significance
** 1% level of significance
___ Not significant

The results indicated that increase in plant population from 14,520 (3'x1' spacing) to 43,560 (1'x1' spacing) plants per acre increased the yield of beans. Only the 3'x1' spacings (or 14,520 plants per acre) treatments differed significantly (5% level of significance) from 1'x1' spacing(or 43,560 plants/acre) treatments. There was no significant difference between the various number of plant rows per bed on yield. Better drainage from raised beds may have accounted for the non-significant differences between all treatments other than R. and L. The benefits of raised beds were more accentuated on the heavy textured cuxu soils. Although the mean yield of treatments L and R were not significant, the difference of $16.50/acre in favour of L of the margin over cost of seed and harvesting was notable. Since bed widths of between 2-3' were found to be easier and cheaper to make by hand or ridger than bed widths of over 4' (on the more heavy textured soils at Central Farm.)Red Kidney Beans planted on 2' width-beds and a spacing of 2'x3"-4", giving a plant population/acre of between 87,120 - 66,000 would give an optimum economic yield.

(d) Post Emergent Weed Control of Red Kidney and Mexican Black Beans (Ref: R.D.975)

Introduction and Object: It has been found at Central Farm that under normal conditions pre-sowing and pre-emergent weed control were unnecessary provided that the seed-bed was efficiently prepared and planting accompanied the last cultivation operation. The object of this trial was to find the optimum methods of post-emergent weed control in Red Kidney and Mexican Black Beans which were compatible with adequate weed control, minimum damage to crop and low costs.

Site: Central Farm
Soil Type: Cuxu black/brown clay loam
Experimental Design: 9x3x2 Randomized Block Design
Observation Plot Size:0.05 acre
Varieties: Red Kidney Bean variety Californian Mexican Black Bean variety Jampa
Planting Date: 20-21/1/65
Spacing: 2'x1'

Crop health and weed control category scores were devised for visual assessments at weekly intervals starting 24/2/65. Treatments were applied at the 2-3 trifoliate leaf stage of the beans (17th February) at which time the weeds were at succeptible stage.

Summary of Results:

Crop Health Category Key: A- Acceptable, healthy, no damage symptoms
B- Temporarily damages
C- Permanent damage (necrosis, chlorisis,stunting and distortion etc.)
D- Severe damage or death to part or all of crop

Weed Control Category E- All weeds killed/controlled
PE- Weeds partially controlled
W- Weeds not controlled

Weeds D- Dicotyledonous (Broadleaf)
M- Monocotyledonous (Grasses, etc.)

The visual assessment results for Red Kidney Bean and Mexican Black Bean treatments are shown in Tables 3(a) and 3(b) respectively.

OVERALL CROP HEALTH AND WEED CONTROL CATEGORIES FOR POST-EMERGENT WEED CONTROL METHODS ON RED KIDNEY BEANS

Treatment	Crop Health				Weed Control			
	24th Feb.	3rd Mar.	10th Mar.	17th Mar,	Feb.	Mar.	Mar.	Mar.
2 Controls:(a)	A	A	A	A	W/DM	W/DM	W/DM	W/DM
(b)	A	A	A	A	W/DM	W/DM	W/DM	W/DM
Hand Hoeing	A	A	A	A	E/DM	E/DM	E/DM	PE/DM
Hand Chisel blade cultivator	A	A	A	A	PE/DM	PE/DM	PE/D W/M	W/D PE/M
*Paraquat (2 Imperial pints/ acre) applied with a shield	A	A	A	A	E/DM	E/DM	E/DM	E/D PE/M
*M.C.P.B. (2 lb ai/ac) Dalapon 5 lb ai/ac)	B	C	C	C	PE/DM	PE/DM	PE/DM	PE/D E/M
M.C.P.B. (2 lb ai/ac) Dalapon 10 lb ai/ac)	B	C	C	C/D	PE/DM	PE/DM	PE/D E/M	E/DM
M.C.P.B. (5 lb ai/ac) Dalapon	C	C/D	C/D	C/D	PE/DM	PE/DM	PE/DM	W/D D/M
M.C.P.B.(5 lb ai/ac) Dalapon 10 lb ai/ac)	C/D	D	D	D	E/DM	E/DM	E/DM	E/DM

*Paraquat(Gramaxone")- a non-residual contact foliage herbicide
M.C.P.B. Bexone - a systemic foliage broadleaf herbicide with selective properties for broadleaves other than legumes.
Dalapon(Gramevin) - a systemic foliage grass herbicide.

It can been seen from Table 3(a) that only the hand hoeing, hand cultivating and Paraquat treatments did not cause overt damage to the crop plant. All the M.C.P. B. treatments caused temporary and permanent damage (low rate) and severe damage and death (high rate) to the crop. Although Dalapon was a grass herbicide it seemed to have added a complimentary effect to the action of M.C.P.B. on both the crop and weeds. Hand hoeing and Paraquat treatments adequately controlled weeds for 3 weeks whereas the Hand cultivator partially controlled weeds for 2 weeks from whence the dicotyledonous weeds (e.g. Emilia coccinea and Euphorbia spp. became dominant. M.C.P.B. at the low rate seemed to have had only partial control effect upon some of the Compcsitive weedsfor the first 3 weeks. The dry weather conditions no doubt helped to control the weedsafter the 4th week. The effect of Dalapon at the low rate on grass weeds (mainly Paspalum spp. and Echinocholoa colonum) was noticed mainly between the 3rd and 4th week after application. M.C.P.B. at the high rate with Dalapon at the low rate only partially controlled broadleaf weeds but at the high treatment with Dalapon (high rate) all broadleaf and grass weeds were eradicated after one week from application until the last observation. The high rate Dalapon effectively controlled grass weeds; the effect was accentuated by the high M.C.P.B. rate.

Table 3(b)

OVERALL CROP HEALTH AND WEED CONTROL CATEGORIES FOR POST-EMERGENT WEED CONTROL METHODS ON MEXICAN BLACK BEANS

Treatment (as in Table 3(a)	Crop Health				Weed Control			
	24th Feb.	3rd Mar.	10th Mar.	17th Mar.	24th Feb.	3rd Mar.	10th Mar.	17th Mar.
2 Controls (a)	A	A	A	A	W/DM	W/DM	W/DM	W/DM
(b)	A	A	A	A	W/DM	W/DM	W/DM	W/DM
Hand Hoeing	A	A	A/B*	A/B*	E/D PE/M	PE/DM	PE/D W/M	PE/D W/M
Hand chisel, blade cultivator.	A	A	A	A	PE/DM	PE/DM	PE/DM	PE/DM
Paraquat	A	A	A	A	PE/D W/M	E/D PE/M	PE/DM	PE/D W/M
M2D5	B	C/B	C	C	W/DM	PE/DM	W/D PE/M	W/D PE/M
M2D10	C	C/D	C/D	C/D	PE/DM	PE/DM	PE/DM E/M	W/D E/M
M5D5	C	D	C/D	D	PE/D	PE/DM	PE/DM	PE/DM
M5D10	D	D	D	D	E/D PE/M	E/DM	E/DM	E/DM

* Powdery Mildew (Erisiphe spp)

The effect of treatments on crop health and weed control of a Mexican Black Bean crop was similar to that of the Red Kidney Bean Trial. Mexican Black Bean plants seemed to have been susceptible to M.C.P.B. even at the low rate. The M.C.P.B. treatments prevented the crop from flowering and generally caused stunting, necrosis of the leaf margins, distortion and death. Except for the high rates of M.C.P.B. and Dalapon, M.C.P.B. treatments gave poor control of the prevalent broad-leaf weeds. The high rates of Dalapon gave effective control of grass weeds whereas the low rates gave partial but adequate control. Paraquat only partially controlled the grass weeds from the 2nd to 3rd week stage and only controlled the broadleaf weeds for the first two weeks. Hand hoeing and hand cultivating partially controlled the broad-leaf weeds. Hand hoeing in this case did not seem to control the grass weeds effectively (the weeding treatment may have been carried out too early.)

Table 3(c)

ECONOMICS OF THE POST-EMERGENT WEED CONTROL TREATMENTS ON RED KIDNEY AND MEXICAN BLACK BEANS

Treatment	Cost of Operation per acre (at $2.54/8 hr. day)	Cost of Materials per acre	Total cos per acre
Hand Hoeing	$25.40	$ -	$25.40
Hand cultivating	7.62	-	7.62
*Paraquat	.85	7.50	8.35
*M2D5	.85	10.75	11.60
*M2D10	.85	17.25	18.10
*M5D5	.85	15.00	15.85
*M5D10	.85	21.50	22.35

*Assuming a person spraying from a 3 gallon capacity pneumatic sprayer at the rate of 3 acres/8 hr. day.

Although from the point of crop health and weed control (intra and inter row control) the hand hoeing method was best, the cost was prohibitive per acre basis. The hand cultivator though the cheapest method gave only inter-row weed control for a short period. Under damp conditions this operation would be more expensive. Paraquat again only controlled inter-row weeds but the cost per acre and control afforded made this treatment the recommended method. Paraquat and Dalapon rates and mixtures may be the optimum control measure.

(e) String Bean Variety Trial (Ref. R.D.976)

Introduction and Objective: The Salada Foods (British Honduras) Ltd. was interested in exploring the possibilities of producing green string beans for the frozen trade. Two varieties were given for a yield trial.

Site: Central Farm
Soil Type: Chechem black clay (slow draining heavy textured alluvial clay)
Experimental Design: 8x2 Randomized Blocks.
Spacing: 1'x3'
Varieties: (a) Pole Bean No. 191 (b) Dwarf Harvester
Dates from 50% germination to first harvest : 25/-*7/6/65 to 6/8/65
Summary of results: The yield results are shown in Table 4

Table 4

Average Yield of Green Pods*(lbs/acre)

Date of Harvest	Pole Bean	Dwarf Harvester
6/8/65	668	173
12/8/65	1957	1134
16/8/65	1254	469
21/8/65	450	193
28/8/65	317	305
2/9/65	476	178
TOTAL	5,122	2,442

* Only pods at the marketable stage were harvested at each picking i.e. the pods were about 5-6" long, ½-½" broad and turgid enough to snap clean.

Despite some damage by stray cattle the Pole Bean variety significantly outyielded the Dwarf Harvester by 109%. From a culinary trial, preference was given for the bush variety. In order to improve the quality of the Pole Bean variety it was concluded that picking intervals be decreased to 3-4 days instead of 4-6 days.

(f) Red Kidney Bean Major Nutrient Trial (Ref. R.D. 977)

A preliminary 3x3x3 randomized factorial trial to study the response of Red Kidney Beans to varying rates of nitrogen, phosphorus and potassium was laid down at Central Farm on the 16th December, 1965. The results will be published in 1966.

(g) Red Kidney Bean Nitrogen Application Trial (Ref. R.D. 978)

A 3x3xa randomized split pot factorial trial to study the effect of 3 types of nitrogenous fertilizers, rates and time of application on Red Kidney Beans has been liaddown at Central Farm on the 17th December, 1965.

(h) Red Kidney Bean Phosphorus Application Trial (Ref. R.D.979)

A 3x3x2 randomized split plot factorial trial to study the effect of rates, time and methods of application of Triple-superphosphate on Red Kidney Beans has been laid down at Central Farm on the 20th December, 1965.

Coconuts

An attempt was made during the year to re-establish the neglected coconut grove at Central Farm on a commercial basis with limited financial labour and machinery resources. Phytosanitation procedures of controlling overbearing of the dwarf varieties, weeding, cutting down and burning of nematode (Rhadinaphelenchus cocophilus - causal organism of Red Ring disease) infested palms, and spraying palms against the Palm Weevil (Rhynochophorus palmarum). Some 11,133 green nuts and 327 dry nuts were sold at Central Farm and in Cayo until the end of July. The grove was bush-hogged at approximately 1½ month intervals and sprayed with Telodrin at 2-3 month intervals (more frequent during the wet season) The numbers of Red Ring and Gru Gru beetle infested palms have been reduced but many palms (infected palms) do not show overt symptoms. All old stumps and leaves were removed from the grove during the dry season while all trees were fertilized with compound fertilizers (12:24:12 and 15:15:15) at average of 3 lbs/palm placed under the "drip zone". Mother trees were selected for seedling supply to the Horticultural Section Nursery (which was not in existence until the end of the year). Larceny by passers-by during the day and organized raiding parties during the night decimated the majority of the nuts saved for the nursery. A barbed wire fence was erected around the grove in December in the hope of reducing thefts and in turn reducing Gru Gru Beetle build up in cut nuts.

Maize (Zea Mais)

(a) Maize Variety Trials (Ref. 916, 919, 920, 921)

Introduction and Object: The first basic essential to increase increase the individual and national productivity of maize would be to find the right varieties adapted to local conditions of growth. Since many farmers still use seeds of mixed and unknown origin of variable yields and quality the need for high yielding varieties for both animal and human consumption is still of prime importance.

Site: a) Central Farm
b) Yo Creek Agricultural Station, Orange Walk
c) Stann Creek Agricultural Station, Stann Creek District
d) Cayo Agricultural Station, Cayo District.

Soil Types: a) Redbank grey-brown silty clay loam.
b) Lazaro dark grey sandy clay.
c) Melinda silty clay.
d) Quamina brown silty clay loam.

Experimental designs: a) 7x4 Randomized Block Desgin
b) 6x4 " " "
c) 6x4 " " "
d) 4x4 " " "

Sample Plot Size: 0.01 acre.

Spacing: 3'x1'

Summary of Results: Poor overall germination and subsequent damage to seedlings by Black birds at Yo Creek resulted in this trial being abandoned after attempts to replant failed. The Stann Creek Trial results were invalidated because of an error made during cleaning operations of the harvested crops. The POEY T66 (double cross yellow hybrid) received for trial purposes was from poor stock;resulting in the germination percentage being as low as 3%.Germination tests were not initially carried because of the late arrival of the seeds. Results of the Central Farm (4 yellow and 3 white varieties) and Cayo Agstat (4 yellow varieties) are shown in Tables 5(a) and (b)

TABLE 5 (a)

CENTRAL FARM- MEAN YIELD CLEAN GRAIN (lbs/acre) at 15% M.C.

Variety	Mean Yield	Standard Error ≠
Control: Coolshade (local yellow)	2,239	157
Corneli 54 (double-cross yellow hybrid)	3,570*	550
VS-550(synthetic yellow)	3,350	241
Poey T23 (double-cross white hybrid)	4,552**	162
H503 (double-cross white hybrid)	3,937**	1955
H507 (double-cross white hybrid)	3,383	472
≠ (Poey T66 (double-cross yellow hybrid)	1,152	-)

*L.S.D. at the 5% level of significance = 1,157
**L.S.D. at the 1% level of significance = 1,600
≠Poor germination. This result was therefore not included in analysis.

TABLE 5 (b)

CAYO AGRICULTURAL STATION - MEAN YIELD OF CLEAN GRAIN (lbs/acre) at 15% M.C.

Variety	Mean Yield	Standard Error ≠
Control: Coolshade	1,874	389
Corneli 54	2,231	251
VS 550	2,042	327
(Poey T66	1,062	-)

≠ This trial could not be statistically analysed because the Poey T66 results were discarded with the subsequent loss in degrees of freedo for the error variance.

All the varieties tested, with the exception of Poey T66, outyielded the Coolshade variety, but only Corneli 54, Poey T23 and H503 were statistically significant. The Coolshade variety grains of variable size and quantity seemed to have been very susceptible to lodging below the ear due to its height(over 15 feet). From the results of previous trials the Coolshade variety was selected as control because of its high yielding characteristic. This variety was far superior to the corn generally grown by local farmers.

The yellow hybrid Corneli 54 produced medium sized plants and medium/large cobs with large smooth grains of uniform size as did the Mexican yellow synthetic variety, VS-550. The main criticism of the VS-550 variety was its susceptibility to bird damage. At the time of writing information received indicated that the strain VS-550A showed longer and lighter husk characteristics and therefore resistance to bird damage. This variety would be useful for improving the local corn yield and quality initially as many farmers still prefer to select their own seed rather than purchase new hybrid seeds every year.

Poey T23 produced large white grains of light quality but seemed susceptible to lodging due to its height. H503 gave a high average yield but yields were highly variable. The quality of the grain was similar to that of Poey T23. Contrary to expectation the yield of H507 was not significant. This may have caused by water logging of 2 plots. Despite low germination %s, the yields from Poey T66 plots were high enough to warrant further testing next year. H503 and VS -550 varieties gave high shelling-out percentages.

(b) Maize Plant Population and Variety Trial (Ref. R.D. 917)

Object: To study the effect of various plant population/spacing on the yield and growth ha it of yellow varieties of maize.
Site: Central Farm
Soil Type: Redbank grey brown silty clay loam.
Experimental Design: 4x4x2 Latin Square Design
Sample Plot size: 0.01 acre
Date of Planting: 29/5/65
Summary of Results: The poor germination of Poey T66 and water logging of plots during the seedling stage invalidated the results for statistical analyses. The results are shown in Table 6 below for 3 varieties.

Table 6

MEAN YIELD OF CLEAN GRAIN (lbs/acre) at 15% M.C.

Variety	Plant Population/acre and Spacing				Total
	43,560 = 1'x1'	21,780 = 2'x1'	14,520 = 3'x1'	10,890 = 4'x1'	
Coolshade	2,019	1,394	2,266	1,128	6,807
VS-550	2,593	2,185	1,616	950	7,344
Corneli 54	1,963	1,732	2,282	1,103	7,080
*Poey T66	1,809	1,031	828	891	4,599
TOTAL	8,384	6,342	6,992	4,072	25,790

* Low germination percentage of 30-36%

Again both the yields of VS-550 and Corneli 54 were higher than the Coolshade variety. VS 550 seemed to have withstood the waterlogging conditions best.

As plant population increased from 10,890 to 43,560 plants per acre yields increased by over 100%; especially notable was the response of the VS-550 variety to closer spacing. Large/medium sized grains were obtained from the 2'xl' and 3'xl' spaced plots while the smallest grains were obtained from the 1'xl' spacings (especially the VS-550 variety).

(c) Maize Planting Date, Seed Rate and Variety Trial (Ref. R.D. 918)

Object: To study the effect of the time of planting, seeding rates on the yield of various maize varieties.
Site: Central Farm
Soil Type: Cuxu black brown clay.
Experimental Design: 6x3x4 Randomized Block Design
Sample Plot Size: 0.0125 acre
" " " 0.0041 acre
Spacing: 3'xl'
Treatments: Planting Dates: 27/5/65, 10/6/65, 24/6/65, 8/7/65
Seed Rate: 1 seed/hole, 2 seeds/hole, 3 seeds/hole
Varieties: Coolshade VS 550
Corneli H503
Poey T66
Summary of Results: An error made during clean operations, as with the Stann Creek Variety Trial, invalidated the results. From visual assessment records;

(a) the planting dates 27/5/65, 10/6/65, 8/7/65 produced good stands whereas the 24/6/65 period (height of the rainy season) gave poor stands generally. Seed-bed preparation was difficult as the season progressed.
(b) The optimum seed rate of 2 seeds/hole(spacing 3'xl') for the 80-90% germination varieties seemed to give good stands.
(c) The 3'xl' spacing and high seed rates of 2 and 3 seeds per hole caused significant lodging of the Coolshade variety.

Rice(Oryza Sativa)

Rice Variety Trials under dryland conditions of growth (Ref. R.D. 943,944,945)

Introduction and Object: (a) To find the yield capacity of a Hoja Blanca resistant/tolerant variety other than Dima.
(b) To find a method of ameliorating the harvest"bottle-neck"problem by the use of varieties with different maturation dates.

Sites: Central Farm, Rancho Dolores, The Dump (Toledo)
Soil Types: Cuxu Black/brown clay loam, Hondo silty loam, Machaca Complex brown/grey clay.

Experimental Design: 3x8 Randomized Block Design
Sample Plot Size: 0.01 acre
Spacing: 1'xl' (4 seeds/hill)
Varieties: Only two varieties namely Belle Patna and Bluebonnet 50 were found to be yield tested against Dima (control)
Summary of Results: The Dump trial was abandoned after severe flooding at the onset and the Bluebonnet 50 variety at the Central Farm trial was significantly damaged by blackbirds. The results for the Rancho Dolores and Central Farm trials are shown in Table 7 and the growth period of the varieties illustrated in Figure I.

TABLE 7

MEAN YIELD OF CLEAN PADDY (lbs/acre) at 14% M.C.

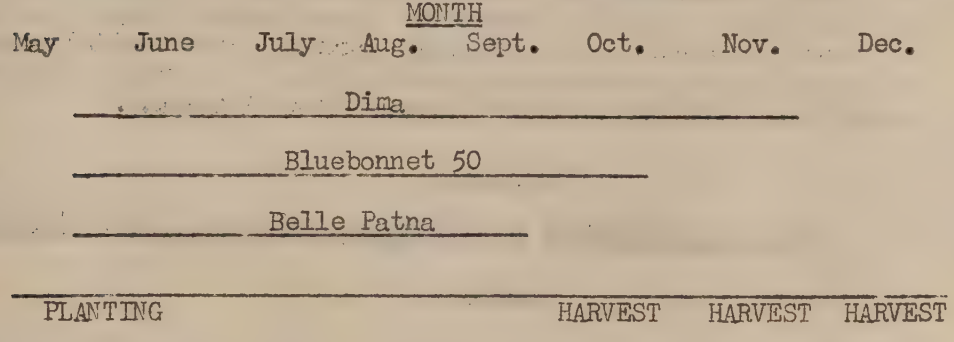
Variety	Rancho Dolores Trial Mean Yield	S.E. ±	Central Farm Trial Mean Yield	S.E. ±
Dima (Control)	3,126	202	2,134	158
Bluebonnet 50	2,827*	165	709	-
Belle Patna	2,623**	210	1,945	187

*Significant at the 5% level
** " " " 1% "

This trial was not statistically analysed because of Blackbird damage to the Bluebonnet variety.

FIGURE I

GROWTH PERIOD OF BELLE PATNA, BLUEBONNET 50 AND DIMA VARIETIES



Since the results of only one trial at one site analysed fully and over one growing season caution must be taken in the interpretation of the results for general application. The trials however indicate that in the 60-90 inches per year rainfall zones Belle Patna, a Hoja Blanca tolerant variety, was capable of producing comparatively high yields under dryland growth conditions and being a short maturing variety (100 day) could be grown as a main crop (twice a year) as a catch-crop and with other longer maturing varieties to help stagger harvests and as a measure of insurance. This variety could substantially increase the yield of paddy per acre per year and the acreage of rice grown for a farmer whose harvesting problem had limited his acreage.

Both Bluebonnet 50 (120 day maturing) and Dima(165 day maturing) varieties have either harvesting or land preparation and planting problems. Dima, being Hoja Blanca resistant and high yielding under dryland conditions would for the present be difficult to replace as a main crop. Bluebonnet 50 being medium maturing variety would mainly be useful to help stagger harvesting bearing in mind that this variety is not resistant to Hoja Blanca and seems susceptible to Leaf Spot(Helminthosporium spp.) Other medium maturing varieties with high yielding capacity and resistance to Hoja Blanca should be tested under local conditions of growth. The higher yields of the longer mature Dima variety were attributed to the higher proportion of fertile tillers per hill and the greater weight of paddy/1000 seeds.

ARABLE/LEY ROTATION TRIAL (REF.R.D.864)

Introduction and Objectives: Research into rotation and alternate husbandry farming systems in this country has been brought to the foreground by the need (a) to develop a sedentary agriculture (i.e. a more away from the milpa system) with its economic husbandry and social advantages. (b) to encourage full-time farming and farmers and (c) to find viable methods of combining pasture fodders, arable crops and livestock into profitable systems.

An alternate husbandry farm unit system was established at Central Farm to primarily lead the way in developing more productive farming systems and to solve the problems of the Unit which will emerge during the course of the trial. Possible lines of research may be developed from the problems encountered.

Approach: It was decided that farm scale rotation trials would give more realistic results than small plot replications. The synthetic approach was adopted whereby the farm unit was established from a theoretically designed basic grass ley/arable rotation. The rotation will be flexible and could be modified as necessary during the duration of the tiral. The farm unit consisted of 6 blocks of approximately 2 acres each and an adjoining permanent pasture (market gardening/residential, etc. block). The plans of the rotation sequence for the 6 year cycle and for an individual block are shown in Figures 2 and 3 below.

Figure 2

PLAN OF LEY/ARABLE ROTATION SEQUENCE FOR A SIX YEAR CYCLE

BLOCKS

Year	1	2	3	4	5	6
1	Ley	Ley	Ley	M/B	S/M/B	S/Mu
2	M/B	Ley	Ley	S/M/B	S/Mu	Ley
3	S/M/B	M/B	Ley	S/Mu	Ley	Ley
4	S/mu	S/M/B	M/B	Ley	Ley	Ley
5	Ley	S/Mu	S/M/B	Ley	Ley	M/B
6	Ley	Ley	S/Mu	Ley	M/B	S/M/B

Key: M- Maize
B- Red Kidney Beans
S- Pasture sorghum (depending upon climate) or fallow
Mu- Maize undersown with a ley grass (Pangola)

Figure 3

PLAN OF A ROTATION CYCLE OF AN INDIVIDUAL BLOCK

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		Ley				X	Maize			X		Beans
2	X	F. or s.				X	Maize			X		Beans
3	X	F. or s.				X	Maize undersown			X		Beans
4						Ley						
5						Ley						
6						Ley						

The preliminary results will be published in 1966.

PRELIMINARY

SOUR GRASS (PASPALUM CONJUGATUM VAR. PUBESCENS) CONTROL BY HERBICIDES TRIAL REF.(R.D. 1032)

Introduction and Object: - Small clumps of Sour Grass (Paspalum conjugatum var. pubescens) has always been a problem in pastures, along fences and ditches at Central Farm. Large areas of sour grass can be controlled by cultivation at the beginning of the dry season so that dry rooted tufts could be killed on the soil surface. The object of trial is to find a suitable and effective herbicide to control or eradicate small clumps or strips of sour grass. By spot-spraying of small areas would be less laborious, cheaper, more efficient and especially desirable in established pastures where the fodder grasses can re-establish themselves over the weeds.

Site: Central Farm
Soil Type: Redbank silty clay loam.
Experimental Design: 9x2 Randomized block design with no replications.
Observation Plot Size: Approx. 0.01 acre
Date Established: 27/7/65
Summary of Results: See table 8 below

Table 8

WEEDCONTROL SCORE FOR HERBICIDE TREATMENT AGAINST CONTROL

Treatment		Sprayed when Fully established		Sprayed after Cutting down to 3" from ground	
Herbicide	Rate	27/8/65	27/9/65	27/8/65	27/9/65
Control(8 plots)		W	W	W	W
Gramoxone(Paraquat)	3 pts/ac	PE	W	PE	PE
Gramevin(Dalapon)	10 lbs/ac	PE	W	PE	PE
Sodium Arsenite	10 lbs/ac	PE	E	E	E
Kanex(P.C.P.)	13 pts/ac	PE	PE	PE	E
Karmex(Diuron)	10 lbs/ac	PE	PE	PE	E
Lorox(Linuron)	5 lbs/ac	PE	PE	PE	PE
Dybar(Fenuron)	50 lbs/Pellets	PE	PE	PE	PE
Stam F34(Propanil)	16 pts/ac	PE	PE	E	E

Key: E - Grass controlled/killed - Necrosis and wilting
PE - Grass partially controlled - Marginal necrosis, Chlorsis, stunting, etc.
W - Weed not controlled.

It can be seen from Table 8 that the stage growth was an important factor in the duration of weed control. The effect of the herbicides were more persistent if the sour grass was cut and allowed to grow for a week prior to spraying. Only sodium arsenite, P.C.P., Diuron and Propanil seemed to have any effect upon the growth of Sour Grass after 2 months from application. Combinations of herbicides tested and varying rates will be tested next year for more effective control measures.

PANGOLA GRASS (DIGITARIA DECUMBENS)NITROGEN AND PHOSPHORUS FERTILIZER TRIAL AT ESTABLISHMENT (REF. R.D. 990)

Object: To study the effect of 3 rates each of P and N (in the form of Triple-superphosphate and Sulphate of Ammonia) on speed of establishment of Pangola grass cuttings.
Site: Block 3 of the Rotation Trial, Central Farm.
Soil Type: Redbank, silty clay loam.
Experimental Design:3x3 Randomized block design with no replication.
Observation Plot Size: 0.01 acre
Treatments: (a) Sulphate of Ammonia (b) Triple-Superphosphate
100 lbs/acre(S/A1) 50 lbs/acre(TSP1)
200 lbs/acre(S/A2) 100 lbs/acre(TSP2)
300 lbs/acre(S/A3) 150 lbs/acre(TSP3)
Summary of Results: From visual assessments only the S/A3, TSP3, S/A3, and TSP2 treatments gave the best results after 3 weeks from planting from the speed of establishment point of view and general thickness of stand. Weed growth, however was also luxuriant with the high rate treatments. The S/A2, TSP1 treatment gave the poorest stand and development.

PANGOLA GRASS (DIGITARIA DECUMBENS)PLANTING MATERIAL RATE (REF.R.D.992)

Object: To study the effect of planting material rates upon the establishment of pangola grass.
Site: Block 3, Rotation trial, Central Farm.
Soil Type: Redbank, silty clay loam.
Experimental Design: 4x4 Randomized Block design.
Observation Plot Size:Only visual assessments were made.
The results are shown in Table 9. All the pangola slips were broadcasted by hand and disc-harrowed.

TABLE 9

MEAN PERCENTAGE COVER OF PANGOLA GRASS IN PLOTS

Treatment (Fresh Weight/Acre)	%Cover over weeds and bare pastures. Observation intervals after planting. 4 weeks	6 weeks
1,000 lbs	30%	40%
2,000 lbs	40%	60%
3,000 lbs	40%	60%
4,000 lbs	35%	50%

The limitations and bias of visual assessments and only 2 observations possible(the plots were damaged by floods in November) have an important bearing in the interpretation of the above results. It would appear that the optimum planting rate would be between 2,000 and 3,000 lbs of Fresh Weight of slips per acre. The low rate was insufficient (up to 6 weeks) to establish quickly in competition with the weeds and the slower establishment of the high rate was probably due to matting caused by clumps of pangola grass slips rather than weed problems.

Sugar cane trials were discontinued as the Research Division of Tate & Lyle have agreed to carry on the work and supply the Department with details.

Seedcane Production Scheme

Block I and II at Xaibe are 119 and 43 acres respectively whilst San Andres is 35 acres, giving a total of 197 acres under seedcane production. The demand for seedcane of new tested varieties was negligible and most of the cane will have to be sold for grinding.

VIII. PEST AND DISEASES

The usual outbreaks of froghopper on sugarcane and pastures occured but the infestation was light. Mexican Fruit Fly showed signs of increase in the citrus growing areas. Swine fever continued to be the major killer of swine whilst ticks are prevalent on cattle though little spraying is done.

IX. LAND CLEARING UNIT

The unit operated in all Districts excepting Toledo and $30,283.00 revenue accrued. The demand for land clearing was not as high as expected and for much of the year the unit was clearing Government land at cost hence the low return. The crawler tractors are now some thirteen years old and maintenance costs are becoming heavy. Private enterprise now accounts for most of the land clearing amd it would seem opportune for the Department to withdraw.

X. STAFF

A list of the senior staff is given in Appendix I. The posts of Soil Chemist, Plant Pathologist, Entomologist, Cane Farming Officer were not filled during the year.

XI. ACKNOWLEDGEMENTS

It gives me great pleasure to acknowledge the help and co-operation which this Department has received from other Government Departments, Commercial concerns and private individuals.

Chief Agricultural Officer

Appendix Nø I

SENIOR STAFF POSTINGS AT AT 31st DECEMBER, 1965

Title	Name	Station
Chief Agricultural Officer	E.W. King	Belize City
Agricultural Education Officer	E.G. Russell	Central Farm (on study leave abroad)
Agronomist	M.W. Silvey	Central Farm
Veterinary Officer	C.W.B. Hatherill	Central Farm
Livestock Officer	O.O. Orio	Central Farm
Agricultural Engineer	J.B. Hutchinson	Central Farm
Veterinary Field Officer	F.F. Orio	Belize City
Agricultural Officers	R.S. Pitt	On vacation
	G.C. Aguilar	Orange Walk
	G.C. Ellis	Corozal
Asst.Agricultural Officers	J.A. Lizama	Corozal
	C.D.W.Atkins	On vacation
	J.A. Swasey	Stann Creek
	T.L. Brackett	Toledo
	[illegible].A. Grant	Cayo
	T.T. Ramos	Belize
Fisheries Officer	C.G. Rosado	Belize

SUMMARY OF RAINFALL FOR 1965

DISTRICTS AND STATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL 1965	TOTAL 1964	AVERAGE 10 YEARS
COROZAL DISTRICT															
Corozal Agstat	3.75	2.42	Nil	1.00	5.38	7.64	3.29	3.93	17.02	6.15	6.73	13.19	70.50	60.68	N/A
Corozal Sugar Factory	.87	1.63	Nil	Nil	3.66	11.63	3.29	6.47	3.39	7.07	5.13	7.52	56.21	63.90	48.95
Cane Station (San Roman)	1.33	.84	.33	Nil	3.32	7.49	7.34	9.15	8.43	5.54	4.09	9.31	57.22	67.68	N.S.
ORANGE WALK DISTRICT															
Orange Walk Agstat	3.33	3.71	.08	.20	1.00	8.46	4.14	8.62	12.49	7.94	2.57	9.00	61.54	N.S.	N.S.
Gallon Jug	3.14	.70	Nil	Nil	.18	15.02	6.98	6.45	8.23	7.57	6.62	4.90	59.27	53.23	57.56
BELIZE DISTRICT															
Belize International Airport	5.27	3.74	.36	2.10	3.16	7.79	5.44	4.70	9.28	8.91	7.79	13.53	70.97	77.64	67.86
Gracie Rock	Nil	1.43	.20	1.65	3.20	11.96	7.89	6.77	8.52	9.59	6.65	13.60	71.91	68.58	72.91
Maskall	2.90	2.51	1.00	.55	.62	6.30	4.32	9.15	16.79	9.15	10.23	14.31	71.53	80.67	68.03
Ambergris Caye	3.38	.60	.60	1.58	.77	6.54	2.66	4.06	10.07	8.70	5.36	8.49	52.81	N.S.	N.S.
Belize City (Landivar)	5.85	2.43	.16	4.44	3.73	8.10	5.24	5.71	11.46	9.43	9.02	15.67	80.39	N.S.	N.S.
Big Falls	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	6.65	5.61	5.24	12.49	7.19	1.50	N.S.	N.S.	N.S.
CAYO DISTRICT															
Central Farm	2.65	.85	.05	.19	1.01	13.34	11.73	3.00	7.46	7.34	8.29	4.66	61.69	53.68	62.80
Augustine Pineridge	3.93	2.90	.24	.60	.25	7.05	4.30	5.21	10.49	6.30	10.93	3.33	54.24	62.59	62.31
Coona Cairn	7.29	1.99	.53	.72	2.21	9.19	6.02	3.41	16.51	11.77	20.56	3.92	89.45	84.92	N.S.
Norland	2.19	.79	.08	.47	.48	10.91	10.30	7.36	8.34	7.71	4.83	9.58	59.54	54.31	59.76
Mia Camp	3.60	.74	.26	.93	1.34	8.07	4.20	2.47	9.19	7.73	12.57	4.93	55.77	60.05	N.S.
Sibun Camp	6.23	3.01	.45	1.49	2.50	1.83	3.15	6.29	12.15	9.03	15.33	7.38	85.54	95.77	N/A
Benque Viejo	1.25	.20	.10	.50	.75	.50	3.12	4.72	2.32	7.43	6.69	3.31	33.19	32.24	N/A
STANN CREEK DISTRICT															
Stann Creek Agstat	5.04	1.10	.20	.36	4.92	7.08	10.36	9.12	11.45	16.33	14.46	15.37	95.82	71.23	83.42
Cow Creek	N/A	4.90	N/A	1.51	2.54	13.93	19.74	15.59	14.45	N/A	13.33	16.94	N/A	99.65	N/A
Pomona	5.98	3.19	.27	.71	3.89	12.56	12.63	11.36	12.12	17.47	14.13	11.19	124.55	94.95	93.41
Melinda Forest Station	5.31	4.41	.09	2.07	3.07	14.50	19.43	15.61	15.28	16.45	11.17	14.05	120.29	115.44	107.87
Savannah Forest Station	5.15	1.47	.21	.92	4.05	7.42	8.46	7.96	11.32	16.58	14.54	16.21	96.25	70.82	N.S.
Sittee River	4.25	2.06	Nil	.64	5.15	11.02	10.43	13.33	15.26	9.07	10.87	12.14	94.20	N/A	N/A
Alta Vista	6.49	1.27	.34	1.40	2.74	11.06	8.79	7.42	12.32	11.68	10.78	13.51	88.20	60.79	N/A
Melinda Farm	7.15	3.82	.33	1.58	3.30	12.54	15.30	17.03	N/A	N/A	14.57	13.04	N/A	106.74	N/A
	4.96	1.15	.27	1.57	2.76	7.86	8.03	9.33	8.12	15.32	9.29	12.51	77.37	62.28	N/A
TOLEDO DISTRICT															
Punta Gorda Town	5.73	1.30	.65	N/A	N/A	16.41	17.34	16.63	N/A	N/A	14.01	13.50	N/A	161.81	N/A
Agstat Toledo	6.41	1.92	.43	.20	4.73	16.07	24.41	22.35	18.22	13.71	12.27	12.06	133.28	143.32	149.48
Machaca Forest Station	7.71	1.49	.39	.59	3.59	20.34	19.03	18.41	19.86	12.30	13.31	10.88	128.53	127.07	127.27
Monkey River Town	8.71	3.23	.03	.45	1.65	5.38	6.69	11.76	15.29	17.20	10.94	12.56	94.39	90.33	99.00
Barranco	5.89	6.38	1.35	1.66	10.63	27.16	37.54	33.04	16.03	14.16	11.42	7.49	172.85	173.72	N/A
Hunting Caye	9.52	6.70	3.44	N/A	N/A	N/A	N/A	21.87	12.10	15.92	12.13	12.62	N/A	N/A	N/A
San Antonio	7.02	1.70	.16	.04	5.73	14.92	13.05	17.41	21.50	10.19	9.99	6.83	114.20	70.21	N/A

Note: N/A - Not available
N.S.- New Station

APPENDIX NØ III

METEOROLOGICAL DATA 1965

MEAN MONTHLY MAXIMUM TEMPERATURE

	Belize Int'l Airport	St. John's College (Londiver)	Agstat No Creek	Agstat S/Creek	Agstat Toledo	Augustine Mountain Shield	Belinda Forest Station	Ambergris Caye	Cooma Cairn Forest St.	Mai Forest Station	San Roman Cane Station	Central Farm Cayo	Savanah Forest Station
January	80.9	N.S.	83.7	80	N.A.	N.A.	79	84	N.A.	N.A.	82	88	86
February	84	N.S.	87.2	83	N.A.	79	84	84	72	78.7	85	87	83.5
March	84.2	N.S.	89.6	84	N.A.	84.5	84.8	86	77	85	88	89	85
April	84	N.S.	90.9	87	N.A.	90	83	88	82	91	91	92	84
May	87.8	N.S.	91.5	87.4	N.A.	88	88	90.5	82	89	91	91.7	87
June	88.2	N.S.	89.1	87	N.A.	88	87	89	80	85	88.5	90.9	86.6
July	87.4	N.S.	90.8	86	N.A.	84	87	91	78	84	88	87	84
August	87.8	87.1	90.5	89	N.A.	84.2	88	93.4	78	86	88	82	86
September	88.4	87.3	89.3	N.A.	N.A.	82.6	85.7	90.7	74.9	82	88.5	81.5	88.4
October	86.7	86.2	88.6	N.A.	N.A.	80.9	87	89.1	71.5	81	87.4	81	85.2
November	84.4	84	88.9	N.A.	N.A.	77.8	84.3	88.1	68.7	79.1	84	81	80.8
December	82.5	82.1	86.5	N.A.	N.A.	76	82.6	84.2	69	76.7	82.9	80.9	N.A.

MEAN MONTHLY MINIMUM TEMPERATURE

January	65.7	N.S.	65.7	67	62	N.A.	68	70	N.A.	N.A.	59	58	80
February	69	N.S.	67.2	69	66	63	72	74.5	65	62	61	63	73
March	69.8	N.S.	67.8	69	65.7	67	72	75	63	62	60	65	72
April	69.5	N.S.	71.1	69	67.9	73	74	71	64.5	64	61	65	81
May	74	N.S.	71.6	72.3	68	69	75	73.4	66	68	67	65	84
June	74.8	N.S.	70.9	73	69	72	76	76	67	67	67	70.4	83.8
July	74.1	N.S.	70.5	76	71	69	76	79	68	69	70	73	83
August	74	76.3	68.3	73.2	71	68.3	76	78.8	67.1	68.8	69	72	83
September	73.9	75.7	66.5	71.0	71	70.1	80.4	72.2	65	65.9	70.4	71.9	84.6
October	73	75	64.9	72	70.8	70	78.3	76.6	62	69.3	68.5	71.3	82.8
November	70	73	61.1	69	67.7	66.4	76.7	74.4	62.4	65.9	66	72	74.5
December	69	71.1	61.1	68.7	64.1	57.2	72.2	72.2	62.5	64.5	63.5	68.3	N.A.

APPENDIX NØ III (a)

METEOROLOGICAL DATA 1965

	MEAN MONTHLY RELATIVE HUMIDITY %										MEAN MONTHLY BAROMETRIC PRESSURE						
	Belize International Airport	Agstat Yo Creek	Agstat S/Creek	Agstat Toledo	Augustine Mt. Pineridge	Melinda Forest Station	Cooma Cairn Forest Station	Mai Forest Station	San Roman Cane Station	Central Farm Cayo	Savanah Forest Station	Belize International Airport	Agstat Yo Creek	Agstat S/Creek	Agstat Toledo	Ambergris Caye	San Roman Cane Station	Savanah Forest Station
[illegible]	84	82.6	89	91	N.A.	87	N.A.	N.A.	96	89	89	30.02	29.97	[illegible]16	29.61	30.02	29.95	29.83
February	85	86.3	87	91	84	78	82	80.5	95	84	66	29.94	29.95	30.1	29.58	29.95	29.84	29.84
March	87	82.9	84	77	77.5	70.5	74	71	92	92	72	29.94	29.97	30.17	29.63	29.96	29.80	29.84
April	69.5	70.4	88	74.4	65	73	64	64	92	90	62	29.93	29.96	29.79	29.60	29.93	29.74	29.77
May	66	76.5	86	78	68	74	68	[illegible]	87	89.6	67	29.90	29.93	30.07	29.[illegible]5	29.90	29.62	29.74
June	72	84.5	90	83	72	77	78	70	92	90.7	73.2	29.88	29.91	30.06	29.48	29.87	N.A.	29.77
July	75	87.3	91	88	77	78	78	77	90	90	73	29.92	29.92	30.12	29.57	29.93	29.66	N.A.
August	83	88.8	90.4	87	78	78	78	74.7	N.A.	91	75	29.95	30.6	30.08	29.54	29.25	N.A.	N.A.
September	83	91.4	N.A.	83	81	73.1	73	79	91.9	90.1	74	29.84	30.91	29.91	29.46	29.81	29.56	N.A.
October	32	90.5	N.A.	87.5	81.2	78.9	75.6	78.8	92	92.1	75.6	29.94	29.9	30.06	29.53	29.89	29.55	N.A.
November	87	83.3	N.A.	89.5	68.5	80.3	84	82.3	97	91.1	74.8	29.96	28.97	30.14	30.36	29.93	N.A.	N.A.
December	83	87.1	N.A.	89.5	N.A.	79.3	89.4	87.4	97	90.8	N.A.	29.99	29.97	30.12	29.57	29.95	N.A.	N.A.

N.A. - NOT AVAILABLE

APPENDIX Nº IV

LIST OF AGRICULTURAL EXPORTS

ARTICLES	QUANTITIES	VALUE $
Bovine Cattle	653 head	67,490
Sheep and Goats	77 "	547
Swine (live)	1,655 "	61,609
Poultry (live)	17,403 "	30,760
Eggs	37,860 doz.	23,331
Fresh Fish	111,000 lbs.	29,091
Lobsters (whole)	13,200 lbs.	4,585
Lobsters (tails)	418,300 "	647,607
Conch	78,900 "	16,873
Fish (dried, smoked or salted)	49,300 "	13,710
Stone Crab	200 "	90
Turtle	900 "	185
Fruits and Vegetables		
Oranges (fresh)	552,700 "	10,537
Tangerine "	7,100 "	302
Grapefruit	11,400 "	217
Plantains and Bananas	88,445 bunches	88,227
Corn	200,000 lbs.	9,295
Coconuts (whole)	221,200 nuts	15,479
Other Edibles	400 lbs.	10
Other Fresh Fruits	81,800 "	4,818
Preserved fruits and nuts	34,300 "	2,093
Grapefruit Segments	4,721,900 "	997,831
Grapefruit Concentrate	401,800 "	73,594
Orange Concentrate	6,390,800 "	1,662,799
Grapefruit Juice	973,400 "	94,358
Orange Juice	6,977,400 "	973,276
Chicle	144,700 "	132,713
Molasses	7,420 tons	111,360
Unrefined Sugar	68,444,500 lbs.	4,967,292
Natural Honey	483,590 lbs.	88,353
Cacao Bean	152,700 lbs.	51,932
Sweet Orange Oil	98,247 lbs.	52,490
Orchid Plants	4,704 plants	402

APPENDIX Nø V

LIVESTOCK

List of main treatments carried out by the Staff of the Department of Agriculture in 1965

Diseases or Treatment	Horses	Cattle	Pigs	Sheep	Poultry	Dogs
Castration	79	82	399	20	-	6
Distemper	8	8	10	-	-	29
Mange	4	3	17	-	-	4
Wounds and Screw worm infestation	72	80	124	11	-	11
Worming	21	58	97	3	238	10
Colic	13	5	-	-	-	1
Rentention of Urine	1	4	49	-	-	-
Mastitis	-	20	1	-	-	-
Infectious warts	1	27	-	-	-	-
Fowl Pox	-	-	-	-	178	-
Coccidiosis	-	6	4	-	1,013	-
Pneumonia(all causes)	-	4	5	-	-	-
Spraying	-	113	-	-	-	-
Influenza	-	-	-	-	-	4
Coryza	-	6	15	-	88	-
Removal Placenta	-	7	97	-	-	1
Lampas	12	-	-	-	-	-
Rabies	-	-	-	-	-	-
Hog Cholera	-	-	103	-	-	-
Tetanus	-	-	1	-	-	-
Inflamations	-	-	1	-	-	-
Constipation	2	-	1	-	-	-
Skin infection	-	-	21	-	-	-
Drench	-	12	3	-	-	-
Stomatitis	54	24	-	-	-	-
Fowl Cholera	-	-	-	-	382	-
Colds	5	3	-	-	77	11
Scours	-	9	23	-	25	-
Diarrhoea	1	2	-	-	5	-
Respiratory infections	9	-	-	-	22	-
Sore Ear	1	-	-	-	-	-
Strangles	1	-	-	-	-	-
Broken forearm	-	-	-	-	-	1
Navel infection	-	-	1	-	-	-

APPENDIX Nø VI

EXPORTS OF FISH

JANUARY - DECEMBER, 1965

	Country	Weight in lbs.	Declared Value $
Fish - Fresh, chilled or frozen	Guatemala, Honduras, U.S.A.	110,756	29,068.00
Fish - Dried, salted or smoked	Guatemala, Honduras	48,986	13,675.00
Conch	Honduras, Guatemala, U.S.A.	78,798	16,863.00
Lobsters (whole)	Guatemala, U.S.A.	13,150	19,980.00
Lobsters (tails)	Guatemala, U.S.A.	418,313	647,607.00

This return excludes figures from Stann Creek and Punta Gorda for the month of December, 1965. 389,586 lbs of lobster tails were exported from July 15th to December 31st, 1965. The remainder was exported from January to March, 1965.

APPENDIX Nø VII

LOBSTER EXPORT QUOTAS

1965-66 Season

Exporter	Original Quota	Approved Additional Quota	Additional Quota Received	Total Quotas Received up to December 31st
Caribeña Producers Co-operative	132,250	62,750	-	132,250
Northern Fishermen's Co-operative	132,646	62,750	37,650	170,296
Proposed National Fishermen Producers Cooperative	73,119	32,181	32,181	105,300
Placencia Producers Co-operative	41,500	20,750	-	41,500
Proposed Toledo Co-operative	6,000	-	-	6,000
TOTALS	385,515	178,431	69,831	455,346

Note: All in pounds of tails

APPENDIX Nø VIII

EXPORTS OF LOBSTER TAILS

July 15 - Dec. 15, 1965

Exporter	Lbs.Exported	Lbs.Declared in Statistics	Percentage Declared	Nø of Lobster Fishermen	Av. Nø of Fishermen giving Statistics	Percentage of Fishermen giving Statistics	Nø of Lobsters Shipped	Av.Weight of Tails in ounces
Caribeña Producers Co-operative	114,980	45,229	39.33	120	106	88.3	266,831	6.9
Northern Fishermen's Co-operative	151,846	61,735	40.65	126	73	57.9	421,120	5.8
Belize National Co-operative	78,520	22,614	28.80	118	47	39.8	203,130	6.2
Placencia Producers Co-operative	29,480	18,930	64.21	45	33	75.5	74,686	8.6
Toledo Group	2,200	2,104	95.64	12	11	91.7	3,563	9.9
TOTALS	377,026	150,612	40.00	421	270	64.1	949,330	7.5

APPENDIX Nº IX

CATCH STATISTICS DATA PROVIDED BY LOBSTER FISHERMEN

NUMBER OF FISHERMEN GIVING RETURNS PER MONTH

JULY 15th - DEC.15th, 1965

Name of Co-operative	Nº.of lobster fishermen	15/7 - 15/8	16/8 - 15/9	16/9-15/10	16/10-15/11	16/11-15/12	Quota Received	Lbs. of Tails Exported up to December 31st.
Caribeña Producers Co-operative	120	104	104	103	121	98	138,250	114,980
Northern Fishermen Co-operative	126	55	76	76	79	77	170,296	156,046
Proposed National Fishermen Producers Co-operative	118	41	18	35	37	104	105,300	86,880
Placencia Producers Co-operative	45	35	39	29	35	28	41,500	29,480
Proposed Toledo Co-operative	12	-	-	10	11	12	6,000	2,200
TOTALS	421	235	237	253	283	319	455,346	389,586
Percent of sample		55.8	56.3	60.1	67.2	75.2		

Note: The Toledo Group started fishing operations in September.

APPENDIX Nø X

RICE PRODUCTION

YEAR	PADDY PURCHASES BY MARKETING BOARD	EQUIVALENT CLEAN RICE	EST. TOTAL PRODUCTION CLEAN RICE	FIVE YEAR MOVING AVERAGE	MARKETING BOARD IMPORTATIONS	EST. CONSUMPTION ON FIVE YEAR MOVING AVERAGE
1954/55	499,407	259,688	370,980	-	3,689,922	-
1955/56	718,692	373,724	533,890	-	3,887,655	-
1956/57	1,301,610	676,832	992,620	-	2,000,000	-
1957/58	1,724,709	896,844	1,281,060	-	3,500,000	-
1958/59	1,850,188	962,104	1,374,430	910,596	1,800,000	3,886,112
1959/60	1,090,619	567,112	810,160	998,432	5,800,000	4,395,963
1960/61	1,561.534	811,980	1,159,970	1,123,648	1,000,000	3,943,648
1961/62	1,967,423	1,023,048	1,461,490	1,217,422	2,500,000	3,937,422
1962/63	1,625,384	845,208	1,207,440	1,202,698	4,000,000	4,022,698
1963/64	2,718,006	1,413,360	2,019,080	1,331,628	3,500,000	4,491,628
1964/65	4,557,887	2,370,108	3,385,870	1,846,770	2,250,000	4,298,770
1965/66	5,229,831*	2,719,496	3,751,024	2,364,981	2,250,000*	5,057,636

* As at 15th February, 1966.